

REMARKS

This application has been carefully reviewed in light of the Office Action dated June 8, 2007. Claims 1-17 remain in this application. Claims 1 and 12 are the independent Claims. It is believed that no new matter is involved in the amendments or arguments presented herein. Reconsideration and entrance of the amendment in the application are respectfully requested.

Double Patenting Rejection

Claims 1-17 were rejected under non-statutory obviousness-type double patenting over Claims 1-14 of U.S. Patent No. 7,136,561 (Enokido).

Applicant includes herewith a terminal disclaimer in compliance with 37 CFR § 1.321(c). Reconsideration and withdrawal of the above rejection are respectfully requested.

Art-Based Rejections

Claims 1-17 were rejected under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Patent No. 5,739,796 (Jasper); Claims 1-6 and 8-17 were rejected under 35 U.S.C. § 102(b) as anticipated by, or in the alternative, under 35 U.S.C. § 103(a) as obvious over U.S. Patent Publication No. 2002/0146196 (Shirane).

Applicant respectfully traverses the rejections and submits that the claims herein are patentable in light of the clarifying amendments above and the arguments below.

The Jasper Reference

Jasper discloses a two-dimensional photonic band gap crystal where a plurality of N equal length dielectric rods with a square cross-sectional dimension

are aligned with constant spacing into first, second, and third rows that are parallel to each other. (See, *Jasper, Fig. 3*)

The Shirane Reference

Shirane teaches cylinder-shaped i-type semiconductors that are aligned in a two-dimensional triangular lattice. (See, Shirane, [0048].)

The Claims are Patentable Over the Cited References

The present application is generally directed to a two-dimensional photonic crystal.

As defined by amended independent Claim 1, a two-dimensional photonic crystal has a plane in which four adjoining unit lattices are arranged so as to have one angle in common with the unit lattice being a rectangle whose shorter side X1 has a length of x_1 and whose longer side Y1 has a length of y_1 . First dielectric regions each being columnar and having a rectangular cross section whose short side X2 has a length of x_2 and whose longer side Y2 has a length of y_2 are disposed on the shorter sides X1 and the longer sides Y1 of each rectangular unit lattice. The first dielectric region is arranged so that the midpoint of the shorter side X1 and the midpoint of the longer side Y1 and the center of the rectangular cross section substantially coincide and are not arranged at the corners of the rectangular unit lattice where shorter side X1 and longer side Y1 intersect. The longer sides Y2 of each first dielectric region are substantially parallel to each other. The first dielectric region is arranged so that the longer side Y2 of the rectangular cross section is substantially parallel to the longer side Y1 of the unit lattice. The ratio of $x_1:y_1$ equals 1:substantially $\sqrt{3}$. The ratio of $x_1:x_2:y_2$ equals 1:0.133:0.48 to 1:0.158:0.58.

The applied references do not disclose or suggest the features of the present invention as defined by amended independent Claim 1. In particular, the applied references do not disclose or suggest, "said first dielectric region is arranged so that the midpoint of said shorter side X1 and the midpoint of said longer side Y1 and the center of said rectangular cross section substantially coincide," as required by independent Claim 1.

Rejections Over Jasper

According to the Office Action, pp. 5-6, Jasper discloses the two-dimensional photonic crystal defined by independent Claim 1, except for the ratio of the x1 and y1 values. Applicants respectfully disagree.

Jasper discloses a two-dimensional photonic band gap crystal where a plurality of N equal length dielectric rods with a square cross-sectional dimension are aligned with constant spacing into first, second, and third rows in parallel with each other. (*See, Jasper, Fig. 3*). Drawing a unit lattice on the N rods of Fig. 3 aligned in the above manner, makes it clear that the midpoints of the N rods coincide with the corners of the unit lattice. A depiction of this is provided for examiner's convenience as Appendix to this submission. The depiction is not otherwise to be considered as a part of this Application.

In contrast, the two-dimensional photonic crystal of independent Claim requires "said first dielectric region is arranged so that the midpoint of said shorter side X1 and the midpoint of said longer side Y1 and the center of said rectangular cross section substantially coincide."

Accordingly, Jasper does not disclose or suggest this feature of the present invention as required by independent Claim 1.

Rejections Over Shirane

On pages 7 and 8, the Office Action states that Shirane discloses a two-dimensional photonic crystal as defined by Independent Claim 1 of the present application, except for the ratio of the x1 and y1 values. Applicants respectfully disagree.

Shirane suggests “the photonic photonic crystal may take other two-dimensional photonic crystal structure such as a square lattice.” (*See, Shirane at [62].*) However Shirane fails to disclose how the cylinder-shaped i-type semiconductors are aligned and, considering that the midpoint of the cylinder-shaped i-type semiconductor of Shirane coincides with the corner, and not the midpoint, of the triangular lattice, one of ordinary skill in the art would clearly understand that the midpoint of the cylinder-shaped semiconductor of Shirane coincides with the corners of a square lattice as well.

Accordingly, Shirane does not disclose or suggest “said first dielectric region is arranged so that the midpoint of said shorter side X1 and the midpoint of said longer side Y1 and the center of said rectangular cross section substantially coincide,” as required by independent Claim 1.

Moreover, Shirane does not disclose, teach or suggest “dielectric regions being columnar and having a rectangular cross section...” and “rectangular unit lattice,” as required by independent Claim 1 of the present invention.

Shirane teaches cylinder-shaped i-type semiconductors aligned in a two-dimensional triangular lattice (*See, Shirane, [0048].*) In contrast, independent Claim 1 requires “dielectric regions being columnar and having a rectangular cross section...” and “rectangular unit lattice” Shirane does not disclose this feature of the present invention as recited in independent Claim 1.

Since the applied references fail to disclose, teach or suggest the above features recited in independent Claim 1, those references cannot be said to anticipate nor render obvious the invention which is the subject matter of that claim.

Accordingly, independent Claim 1 is believed to be in condition for allowance and such allowance is respectfully requested.

Applicant respectfully submits that independent Claim 12 is allowable for at least the same reasons as discussed above with reference to amended independent Claim 1 and such allowance is respectfully requested.

The remaining claims depend either directly or indirectly from independent Claims 1 and 12 and recite additional features of the invention which are neither disclosed nor fairly suggested by the applied references and are therefore also believed to be in condition for allowance.

Conclusion

In view of the foregoing, it is respectfully submitted that the application is in condition for allowance. Reexamination and reconsideration of the application, as amended, are requested.

If for any reason the Examiner finds the application other than in condition for allowance, the Examiner is requested to call the undersigned attorney at the Los Angeles, California telephone number (310) 785-4721 to discuss the steps necessary for placing the application in condition for allowance.

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If there are any fees due in connection with the filing of this response, please charge the fees to our Deposit Account No. 50-1314.

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Respectfully submitted,

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